

Amendments to the Claims: This listing of claims will replace all prior versions, and listings, of claims in the application

Listing of Claims:

1. (Currently Amended) A method for producing a yarn consisting of numerous filaments, using:

(a) a spinneret having numerous spinning holes to discharge a flowable polymer continuously for forming filaments,

(b) a spinning tube having a filament passage through which the numerous filaments formed by said numerous spinning holes run downward from said spinneret, and installed below and spaced from said spinneret,

(c) an oiling meansdevice for applying an oil to the numerous filaments coming out of said spinning tube,

(d) a filament take-up meansdevice for taking up the numerous filaments coming from said oiling meansdevice, and

(e) a winding meansdevice for winding the numerous filaments coming from said filament take-up meansdevice, ~~characterized in that~~wherein

(f) gas injection holes are provided, which inject gas obliquely downward from outside the numerous filaments entering the filament passage of said spinning tube, toward the numerous filaments, while the numerous filaments are still flowable, to ensure that the numerous filaments can be disposed along ~~one a~~ straight line ~~or one circle~~ without overlapping each other, and further to ensure that, subsequently after disposing the numerous filaments, the injected gas can form a gas stream flowing downward together with the numerous filaments in the filament passage of said spinning tube, and

(g) ~~the velocity of the gas stream flowing downward together with the numerous filaments in the filament passage of said spinning tube is not less than 60% of a take-up speed of the numerous filaments taken up by said filament take-up meansthe cross sectional form of the filament passage of said spinning tube is rectangular; the direction of the long~~

sides of said rectangle agrees with the direction of said straight line; and the following relation is satisfied

$$d \times 3 \leq E_x \leq d \times 20$$

where E_x is the length of the short sides of said rectangle, and d is the diameter of said spinning holes.

2. Cancelled

3. (Currently Amended) A method for producing a yarn, according to claim 229, wherein said numerous spinning holes are arranged in at least one straight lines; and the number of the straight lines is 3 or less.

4. (Currently Amended) A method for producing a yarn, according to claim 1, wherein the following relation is satisfied:

$$L_a \leq L_g/2$$

where L_g is the distance between said spinneret and the position at which said numerous filaments are solidified to lose their flowability and reach the take-up speed of the numerous filaments taken up by said filament take-up meansdevice, and L_a is the distance between said spinneret and the position at which the acceleration of said numerous filaments becomes largest.

5. (Currently Amended) A method for producing a yarn, according to claim 4, wherein the velocity of the gas stream flowing downward together with said numerous filaments in the filament passage of said spinning tube is higher than the running speed of said numerous filaments in the range of the distance L_g between said spinneret and the position at which the running speed of said numerous filaments reaches the take-up speed of the numerous filaments taken up by said filament take-up meansdevice.

6. (Currently Amended) A method for producing a yarn, according to claim 1, wherein a gas suction and discharge meansdevice for sucking and discharging gas existing around the numerous filaments running from said spinning holes toward said filament passage

is installed between said spinneret and said spinning tube, to ensure that the gas existing around said numerous filaments can be sucked and discharged.

7. Cancelled

8. (Currently Amended) A method for producing a yarn consisting of numerous filaments, using:

(a) a spinneret having numerous spinning holes formed to discharge a flowable polymer continuously for forming filaments,

(b) a spinning tube having a filament passage through which the numerous filaments formed by said numerous spinning holes run downward from said spinneret, and installed below and spaced from said spinneret,

(c) an oiling meansdevice for applying an oil to the numerous filaments coming out of said spinning tube,

(d) a filament take-up meansdevice for taking up the numerous filaments coming from said oiling meansdevice, and

(e) a winding meansdevice for winding the numerous filaments coming from said filament take-up meansdevice,

~~characterized in that~~wherein

(f) gas injection holes are provided, which inject gas obliquely downward from outside the numerous filaments entering the filament passage of said spinning tube, toward the numerous filaments, while the numerous filaments are still flowable, to ensure that the numerous filaments can be disposed along ~~one~~a straight line or ~~one~~a circle without overlapping each other, and further to ensure that, subsequently after disposing the numerous filaments, the injected gas can form a gas stream flowing downward together with the numerous filaments in the filament passage of said spinning tube, and

~~(g) the following relation is satisfied:~~

$$\text{—} L_a \leq L_g/2$$

~~where L_g is the distance between said spinneret and the position at which said numerous filaments are solidified to lose their flowability and reach the take-up speed of the numerous filaments taken up by said filament take-up means, and L_a is the distance between said spinneret and the position at which the acceleration of said numerous filaments becomes largest~~the width of said filament passage in the direction perpendicular to the direction in which said numerous filaments are disposed side by side is 10mm or less.

9. Cancelled

10. (Currently Amended) A method for producing a yarn consisting of numerous filaments, using:

(a) a spinneret having numerous spinning holes formed to discharge a flowable polymer continuously for forming filaments,

(b) a spinning tube having a filament passage through which the numerous filaments formed by said numerous spinning holes run downward from said spinneret, and installed below and spaced from said spinneret,

(c) an oiling ~~means~~device for applying an oil to the numerous filaments coming out of said spinning tube,

(d) a filament take-up ~~means~~device for taking up the numerous filaments coming from said oiling ~~means~~device, and

(e) a winding ~~means~~device for winding the numerous filaments coming from said filament take-up ~~means~~device,

~~characterized in that~~wherein

(f) gas injection holes are provided, which inject gas obliquely downward from outside the numerous filaments entering the filament passage of said spinning tube, toward the numerous filaments, while the numerous filaments are still flowable, to ensure that the numerous filaments can be disposed along ~~one~~ a straight line or ~~one~~ a circle without overlapping each other, and further to ensure that, subsequently after disposing the numerous

filaments, the injected gas can form a gas stream flowing downward together with the numerous filaments in the filament passage of said spinning tube, and

(g) a gas suction device is provided between said spinneret and said spinning tube, to suck the gas existing around said numerous filaments and to discharge the gas outside.

11. (Cancelled)

12. (Original) A method for producing a yarn, according to claim 10, wherein the suction of the gas existing around said numerous filaments is carried out on both sides of the disposal of said numerous filaments.

13. (Original) A method for producing a yarn, according to claim 10, wherein said numerous spinning holes are arranged in straight lines; and the number of the straight lines is 3 or less.

14. (Original) A method for producing a yarn, according to claim 10, wherein outside air suction spaces are formed between said gas suction device and said spinning tube, to ensure that the sucked outside air flows into said filament passage.

15. (Currently Amended) An apparatus for producing a yarn consisting of numerous filaments, having:

(a) a spinneret having numerous spinning holes formed to discharge a flowable polymer continuously for forming filaments,

(b) a spinning tube having a filament passage through which the numerous filaments formed by said numerous spinning holes run downward from said spinneret, and installed below and spaced from said spinneret,

(c) an oiling ~~means~~device for applying an oil to the numerous filaments coming out of said spinning tube,

(d) a filament take-up ~~means~~device for taking up the numerous filaments coming from said oiling ~~means~~device, and

(e) a winding ~~means~~device for winding the numerous filaments coming from said filament take-up ~~means~~device, characterized in that ~~wherein~~

(f) gas injection holes are provided, which inject gas obliquely downward from outside the numerous filaments entering the filament passage of said spinning tube, toward the numerous filaments, while the numerous filaments are still flowable, to ensure that the numerous filaments can be disposed along ~~one~~a straight line ~~or one circle~~ without overlapping each other, and further to ensure that, subsequently after disposing the numerous filaments, the injected gas can form a gas stream flowing downward together with the numerous filaments in the filament passage of said spinning tube, and

(g) ~~a means is provided for adjusting the injection conditions of the gas injected from said gas injection holes or adjusting the take-up speed of the numerous filaments taken up by said filament take-up means, to ensure that the velocity of the gas stream flowing downward together with the numerous filaments in the filament passage of said spinning tube is not less than 60% of the take-up speed of the numerous filaments taken up by said filament take-up means~~ the cross sectional form of the filament passage of said spinning tube is rectangular; the direction of the long sides of said rectangular agrees with the direction of said straight line; and the following relation is satisfied:

$$d \times 3 \leq E_x \leq d \times 20$$

where E_x is the length of the short sides of said rectangle, and d is the diameter of said spinning holes.

16. Cancelled

17. (Currently Amended) An apparatus for producing a yarn, according to claim ~~16~~15, wherein said numerous spinning holes are arranged in at least one straight lines; and the number of the straight lines is 3 or less.

18. (Currently Amended) An apparatus for producing a yarn, according to claim 15, wherein the following relation is satisfied:

$$L_a \leq L_g/2$$

where L_g is the distance between said spinneret and the position at which said numerous filaments are solidified to lose their flowability and reach the take-up speed of the numerous filaments taken up by said filament take-up ~~means~~device, and L_a is the distance between said spinneret and the position at which the acceleration of said numerous filaments becomes largest.

19. (Currently Amended) An apparatus for producing a yarn, according to claim 18, wherein the velocity of the gas stream flowing downward together with said numerous filaments in the filament passage of said spinning tube is higher than the running speed of said numerous filaments, in the range of the distance L_g between said spinneret and the position at which the running speed of the numerous filaments reaches the take-up speed of the numerous filaments taken up by said filament take-up ~~means~~device.

20. (Currently Amended) An apparatus for producing a yarn, according to claim 15, wherein a gas suction and discharge ~~means~~device for sucking and discharging the gas existing around the numerous filaments running from said spinning holes toward said filament passage is installed between said spinneret and said spinning tube, to ensure that the gas existing around said numerous filaments can be sucked and discharged.

21. Cancelled

22. (Currently Amended) An apparatus for producing a yarn consisting of numerous filaments, having:

(a) a spinneret having numerous spinning holes formed to discharge a flowable polymer continuously for forming filaments,

(b) a spinning tube having a filament passage through which the numerous filaments formed by said numerous spinning holes run downward from said spinneret, and installed below and spaced from said spinneret,

(c) an oiling ~~means~~device for applying an oil to the numerous filaments coming out of said spinning tube,

(d) a filament take-up ~~means~~device for taking up the numerous filaments coming from said oiling ~~means~~device, and

(e) a winding ~~means~~device for winding the numerous filaments coming from said filament take-up ~~means~~device,

~~characterized in that~~wherein

(f) gas injection holes are provided, which inject gas obliquely downward from outside the numerous filaments entering the filament passage of said spinning tube, toward the numerous filaments, while the numerous filaments are still flowable, to ensure that the numerous filaments can be disposed along ~~one~~a straight line or ~~one~~a circle without overlapping each other, and further to ensure that, subsequently after disposing the numerous filaments, the injected gas can form a gas stream flowing downward together with the numerous filaments in the filament passage of said spinning tube, and

(g) ~~the following relation is satisfied:~~

$$\text{—} \quad L_a \leq L_g/2$$

~~where L_g is the distance between said spinneret and the position at which said numerous filaments are solidified to lose their flowability and reach the take-up speed of the numerous filaments taken up by said filament take-up means, and L_a is the distance between said spinneret and the position at which the acceleration of said numerous filaments becomes largest~~the width of said filament passage in the direction perpendicular to the direction in which said numerous filaments are disposed side by side is 10mm or less.

23. Cancelled

24. (Currently Amended) An apparatus for producing a yarn consisting of numerous filaments, having:

(a) a spinneret having numerous spinning holes formed to discharge a flowable polymer continuously for forming filaments,

(b) a spinning tube having a filament passage through which the numerous filaments formed by said numerous spinning holes run downward from said spinneret, and installed below and spaced from said spinneret,

(c) an oiling ~~means~~device for applying an oil to the numerous filaments coming out of said spinning tube,

(d) a filament take-up ~~means~~device for taking up the numerous filaments coming from said oiling ~~means~~device, and

(e) a winding ~~means~~device for winding the numerous filaments coming from said filament take-up ~~means~~device,

~~characterized in that~~wherein

(f) gas injection holes are provided, which inject gas obliquely downward from outside the numerous filaments entering the filament passage of said spinning tube, toward the numerous filaments, while the numerous filaments are still flowable, to ensure that the numerous filaments can be disposed along ~~one~~a straight line or ~~one~~a circle without overlapping each other, and further to ensure that, subsequently after disposing the numerous filaments, the injected gas can form a gas stream flowing downward together with the numerous filaments in the filament passage of said spinning tube, and

(g) a gas suction device is installed between said spinneret and said spinning tube, to suck the gas existing around said numerous filaments and to discharge the gas outside.

25. Cancelled

26. (Original) An apparatus for producing a yarn, according to claim 24, wherein the suction of the gas existing around said numerous filaments is carried out on both sides of the disposal of said numerous filaments.

27. (Original) An apparatus for producing a yarn, according to claim 24, wherein said numerous spinning holes are arranged in straight lines; and the number of the straight lines is 3 or less.

28. (Original) An apparatus for producing a yarn, according to claim 24, wherein outside air suction spaces are formed between said gas suction device and said spinning tube, to ensure that the sucked outside air flows into said filament passage.

29. (New) A method for producing a yarn, according to claim 1, wherein the velocity of the gas stream flowing downward together with the numerous filaments in the filament passage of said spinning tube is not less than 60% of a take-up speed of the numerous filaments taken up by said filament take-up device.

30. (New) A method for producing a yarn, according to claim 4, wherein the velocity of the gas stream flowing downward together with said numerous filaments in said filament passage is higher than the running speed of said numerous filaments.

31. (New) A method for producing a yarn, according to claim 8, wherein a gas suction device is provided between said spinneret and said spinning tube, to suck the gas existing around said numerous filaments and to discharge the gas outside.

32. (New) A method for producing a yarn, according to claim 31, wherein the suction of the gas existing around said numerous filaments is carried out on both sides of the disposal of said numerous filaments.

33. (New) A method for producing a yarn, according to claim 31, wherein said numerous spinning holes are arranged in straight lines; and the number of the straight lines is 3 or less.

34. (New) A method for producing a yarn, according to claim 31, wherein outside air suction spaces are formed between said gas suction device and said spinning tube, to ensure that the sucked outside air flows into said filament passage.

35. (New) An apparatus for producing a yarn, according to claim 15, wherein a device is provided for adjusting the injection conditions of the gas injected from said gas injection holes or adjusting the take-up speed of the numerous filaments taken up by said filament take-up device, to ensure that the velocity of the gas stream flowing downward together with the numerous filaments in the filament passage of said spinning tube is not less than 60% of the take-up speed of the numerous filaments taken up by said filament take-up device.

36. (New) An apparatus for producing a yarn, according to claim 18, wherein the velocity of the gas stream flowing downward together with said numerous filaments in said filament passage is higher than the running speed of said numerous filaments.

37. (New) An apparatus for producing a yarn, according to claim 22, wherein a gas suction device is installed between said spinneret and said spinning tube, to suck the gas existing around said numerous filaments and to discharge the gas outside.

38. (New) An apparatus for producing a yarn, according to claim 37, wherein the suction of the gas existing around said numerous filaments is carried out on both sides of the disposal of said numerous filaments.

39. (New) An apparatus for producing a yarn, according to claim 37, wherein said numerous spinning holes are arranged in straight lines; and the number of the straight lines is 3 or less.

40. (New) An apparatus for producing a yarn, according to claim 37, wherein outside air suction spaces are formed between said gas suction device and said spinning tube, to ensure that the sucked outside air flows into said filament passage.